

always up to standard. This is not the case if the unit is put into operation immediately after washing at the full rate.

The provision of these modern and automatic units makes for greater efficiency and lower running costs. The ease of carrying out the washing operations means that the units are out to operation for a much shorter time and therefore the nett filtering capacity is increased.

The recording instruments provided enable an infallible check to be kept on the performance of the plant by the responsible officer.

#### STERILIZATION

After the filtration the water will be clean and bright and free from all suspended matter. Approximately 95% of all bacteria will have been removed but to ensure that there is no possibility of any harmful bacteria passing into the distribution system, a minute dose of chlorine and ammonia is added to the water.

These chemicals will sterilize the water and will also provide the water with a resistance to after-infection so that any pollution finding its way into the distribution system is counteracted.

#### CORROSION CONTROL

The action of water on steel and cast iron is often the cause of rapid and costly deterioration of the distribution system. Corrosion is controlled by adjustment of the pH of the water and this will be raised when required by the addition of lime after filtration.

#### LABORATORY

A chemical and bacteriological laboratory is provided and tests are carried out as a matter of routine to ensure that proper purification is taking place.

#### SOFTENING

A feature of the plant is that provision has been made in the design so that when the ultimate capacity of eight million gallons per day is installed, two million gallons of this can be softened by the Lime Soda Ash process. This was done as it was felt that a softened supply would be appreciated by the mills and other industrial concerns in Indore.

#### GENERAL

The plant was designed by the author with the assistance of Candy Filters (India) Ltd., water purification specialists. All equipment was provided by this firm.

## India's Forest Pests

THE biological data collected at the Forest Research Institute, Dehra Dun, after years of research and now made available to the public in a recent publication in the *Indian Forest Records* (new series) Entomology, have been found to be of great assistance in organising a fight against the numberless pests which cause enormous losses to India's forest wealth.

The average annual loss due to the sal borer, for instance, in Government forests alone is not less than Rs. 2,50,000, while in epidemics the loss may rise to enormous proportions.

In a small epidemic affecting eight square miles of forest in the United Provinces, 45,000 trees with timber content of nearly a million cubic feet, were killed with a loss of Rs. 2,70,000.

The most serious epidemic on record was one which affected five forest divisions of the Central Provinces, an Indian State and extensive private land. When remedial measures were taken, it was found that, on 150,000 acres of sal forest in two divisions, timber, valued at about Rs. 7,50,000 had been destroyed. In the following year the

attack extended to 5,500,000 trees in this area, with a loss of forest capital of nearly Rs. 1,37,50,000. Before the epidemic was checked, the total number of trees attacked over the whole infested area rose to 7,000,000. Four years of control operations and an expenditure of Rs. 1,25,800 were necessary, before the epidemic was definitely overcome.

Particularly injurious to avenue and shade trees planted in towns and along roads, especially willows and poplars, is a pest called *Æolesthes sarta*. It also works damage in fruit orchards. The avenue and garden trees of Quetta were severely attacked by this borer in 1904-06, necessitating the felling of some 5,000 trees. Over 20,000 beetles were collected and destroyed in 1905 and 3,000 in 1906.

Another beetle (*Chlorophorus strobilicola*) which attacks the cones of pines from altitudes of 2,000 feet to 6,500 feet, is the commonest in open sunny stands of chir pine. The damage done is almost negligible in a good seed year, but when cones are few the proportion infested may rise to even as high as 40 per cent,